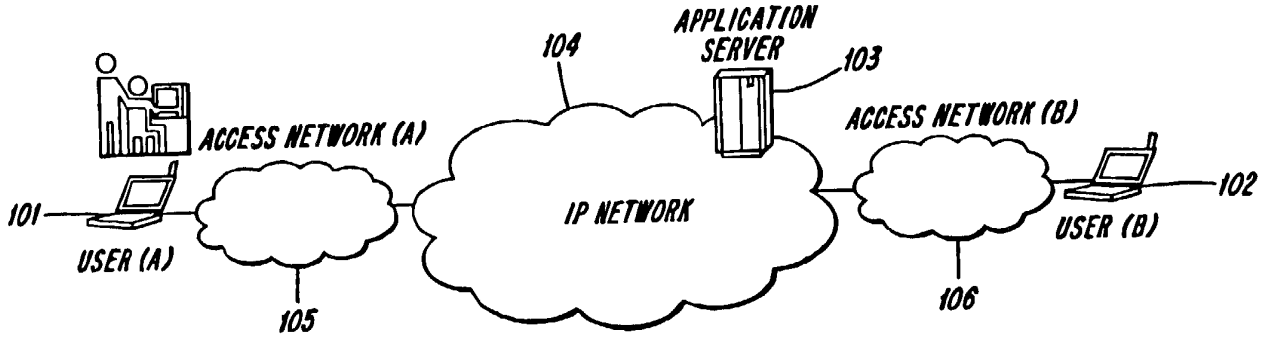

APPLICATION SERVER
104
103
ACCESS NETWORK (A)
ACCESS NETWORK (B)
101
USER (A)
IP NETWORK
102
USER (B)
105
106

Fig. 1

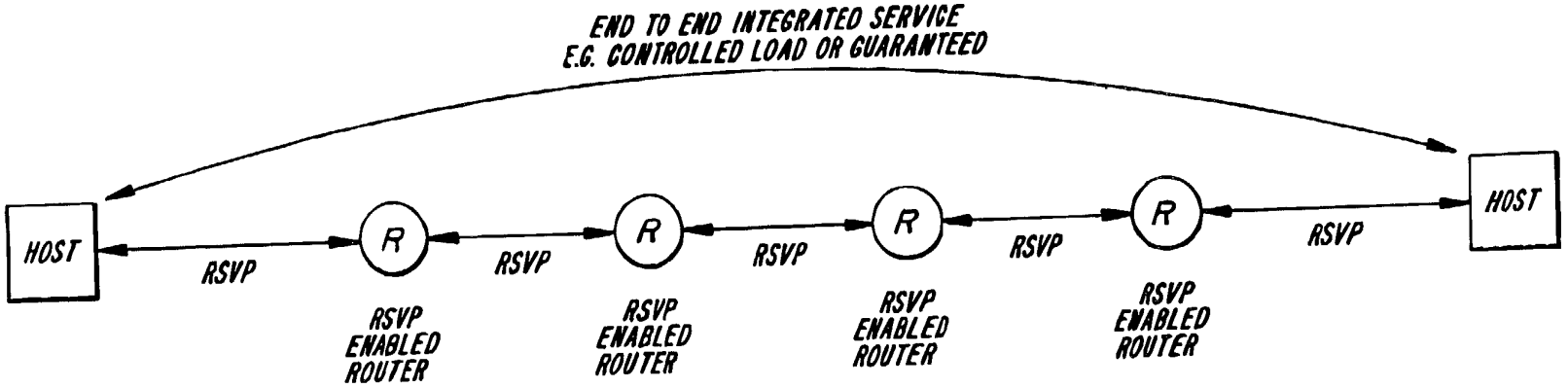

END TO END INTEGRATED SERVICE
E.G. CONTROLLED LOAD OR GUARANTEED
HOST
R
RSVP
RSVP ENABLED ROUTER
HOST

Fig. 2

EP 1 261 181 A2

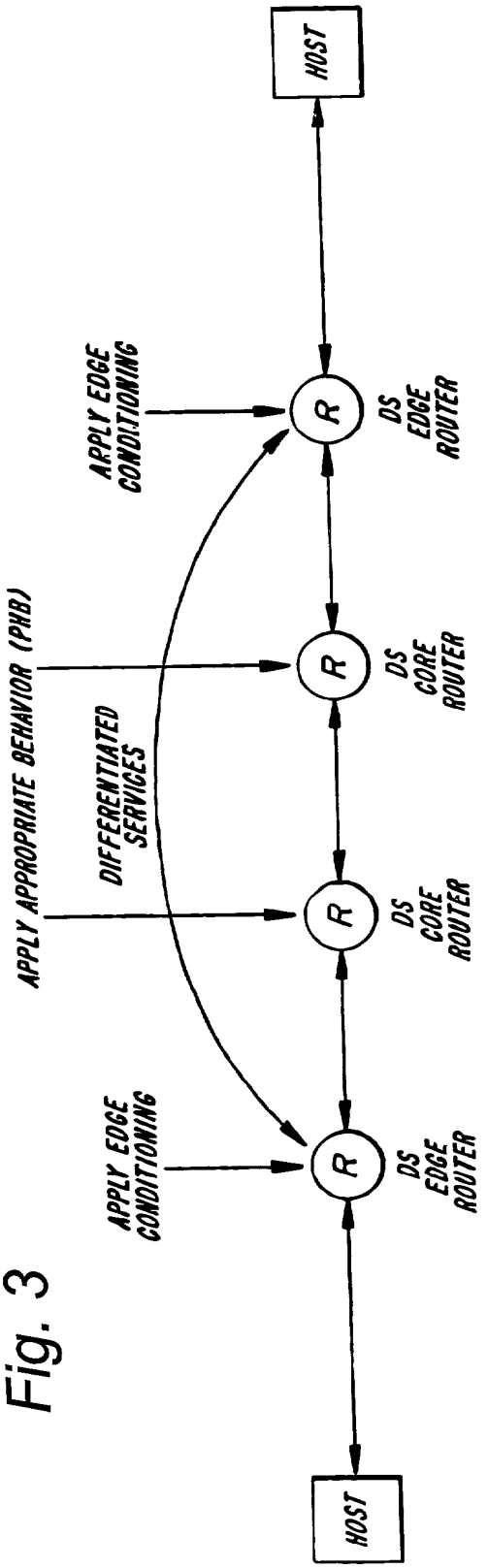


Fig. 3

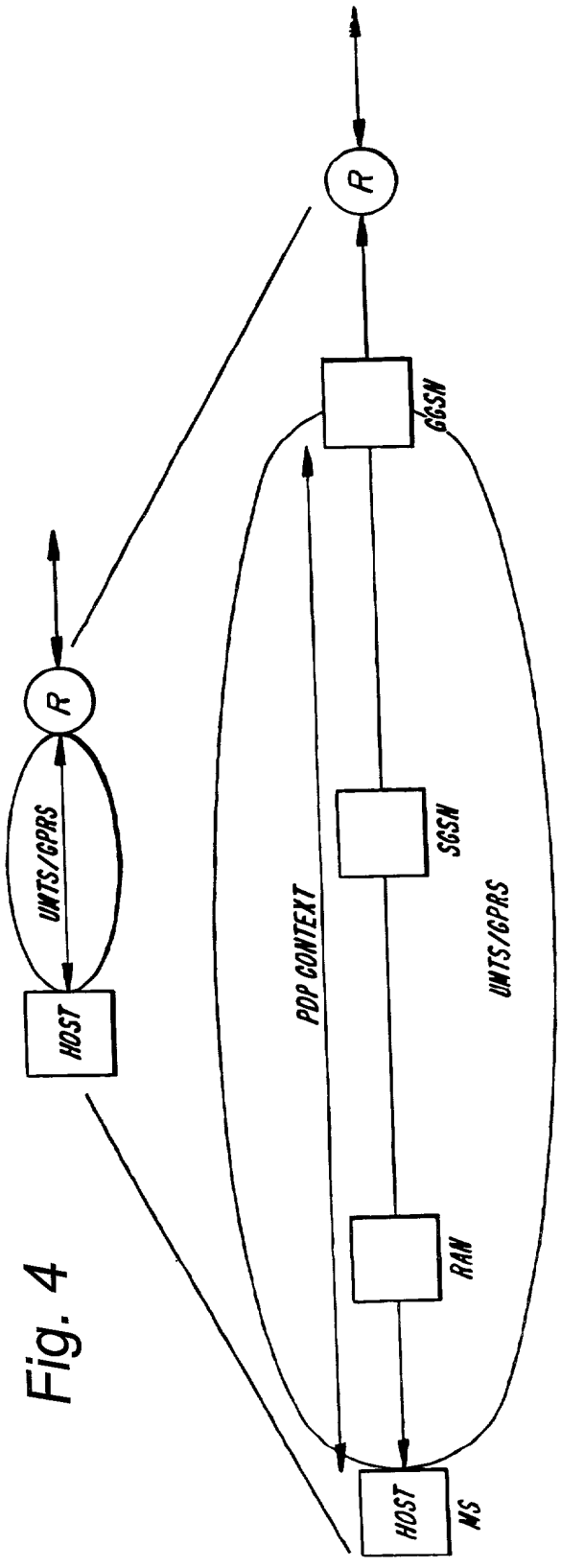


Fig. 4

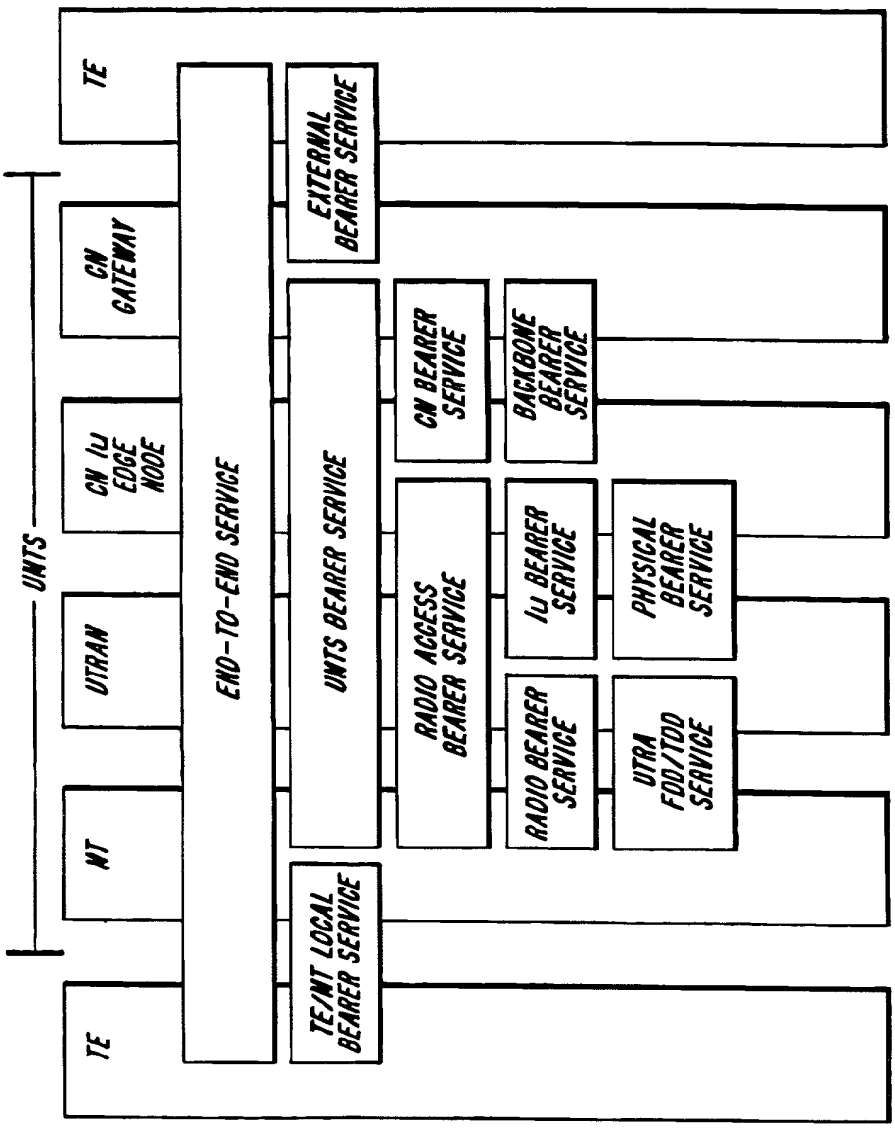
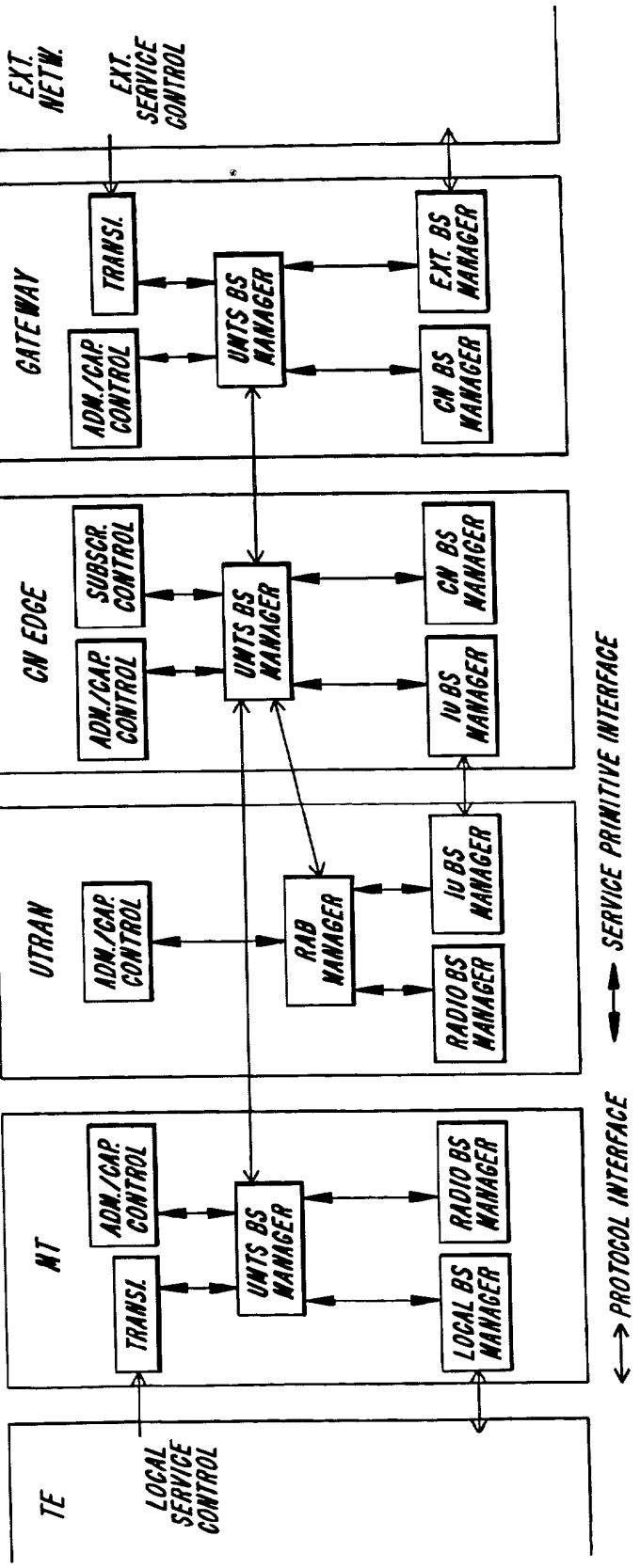

TE
MT
UTRAN
CN IU EDGE NODE
CN GATEWAY
TE
UMTS
END-TO-END SERVICE
UMTS BEARER SERVICE
RADIO ACCESS BEARER SERVICE
CN BEARER SERVICE
BACKBONE BEARER SERVICE
EXTERNAL BEARER SERVICE
TE/MT LOCAL BEARER SERVICE
RADIO BEARER SERVICE
IU BEARER SERVICE
UTRA FDD/TDD SERVICE
PHYSICAL BEARER SERVICE

Fig. 5

Fig. 6


TE
LOCAL SERVICE CONTROL
MT
TRANSL
ADM./CAP. CONTROL
UMTS BS MANAGER
LOCAL BS MANAGER
RADIO BS MANAGER
UTRAN
ADM./CAP. CONTROL
RAB MANAGER
RADIO BS MANAGER
Iu BS MANAGER
CN EDGE
ADM./CAP. CONTROL
SUBSCR. CONTROL
UMTS BS MANAGER
Iu BS MANAGER
CN BS MANAGER
GATEWAY
ADM./CAP. CONTROL
TRANSL
UMTS BS MANAGER
CN BS MANAGER
EXT. BS MANAGER
EXT. NETW.
EXT. SERVICE CONTROL
PROTOCOL INTERFACE
SERVICE PRIMITIVE INTERFACE

20080TD"0278600E

TRAFFIC CLASS	CONVERSATIONAL CLASS CONVERSATIONAL RT	STREAMING CLASS STREAMING RT	INTERACTIVE CLASS INTERACTIVE BEST EFFORT	BACKGROUND BACKGROUND BEST EFFORT
FUNDAMENTAL CHARACTERISTICS	• PRESERVE TIME RELATION (VARIATION) BETWEEN INFORMATION ENTITIES OF THE STREAM • CONVERSATIONAL PATTERN (STRINGENT AND LOW DELAY)	• PRESERVE TIME RELATION (VARIATION) BETWEEN INFORMATION ENTITIES OF THE STREAM	• REQUEST RESPONSE PATTERN • PRESERVE PAYLOAD CONTENT	• DESTINATION IS NOT EXPECTING THE DATA WITHIN A CERTAIN TIME • PRESERVE PAYLOAD CONTENT
EXAMPLE OF THE APPLICATION	- VOICE	- STREAMING VIDEO	- WEB BROWSING	- BACKGROUND DOWNLOAD OF EMAILS

Fig. 8

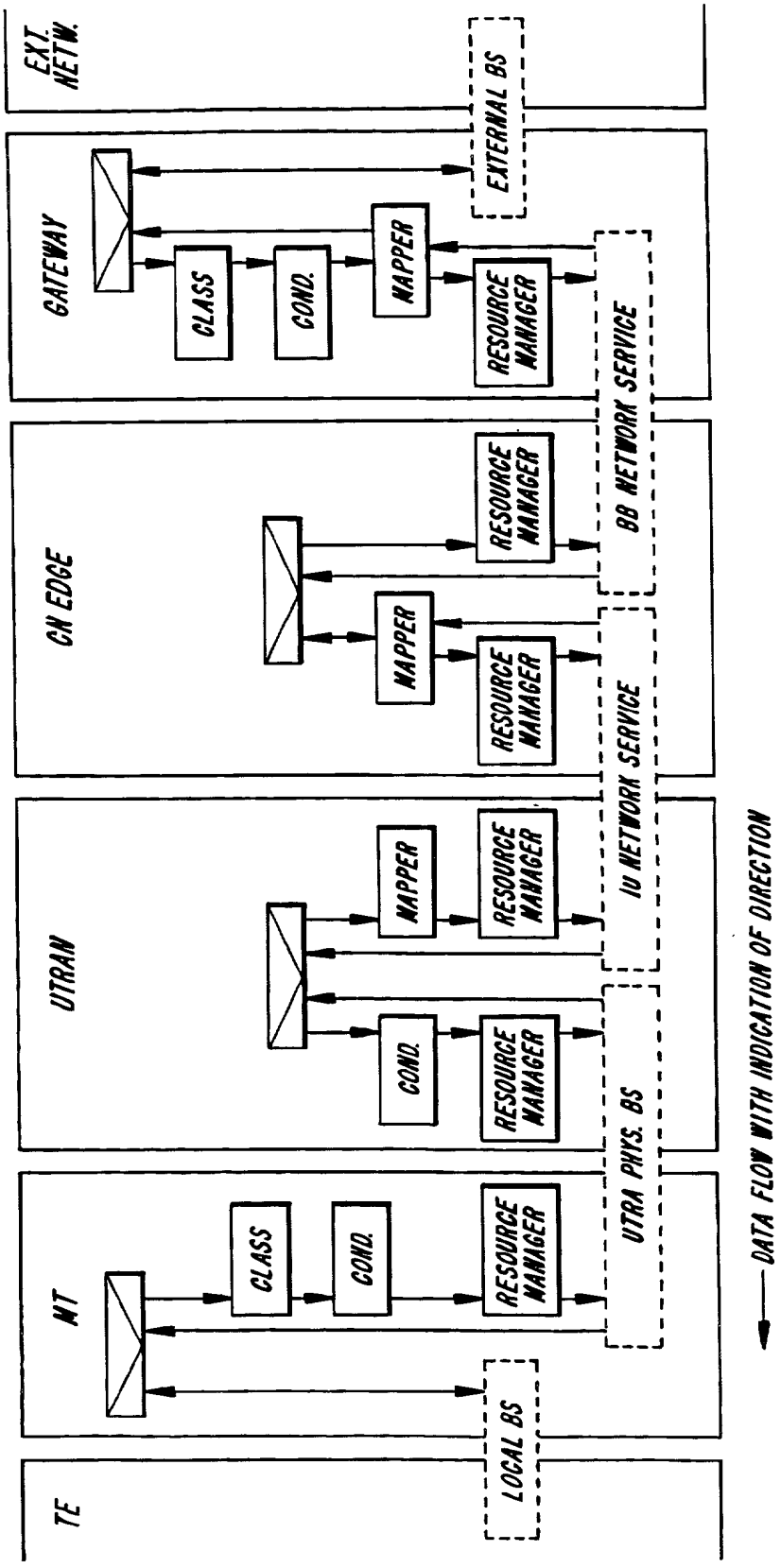

TE
MT
CLASS
COND.
RESOURCE MANAGER
LOCAL BS
UTRAN
MAPPER
RESOURCE MANAGER
COND.
RESOURCE MANAGER
UTRA PHYS. BS
Iu NETWORK SERVICE
CN EDGE
RESOURCE MANAGER
MAPPER
RESOURCE MANAGER
BB NETWORK SERVICE
GATEWAY
CLASS
COND.
MAPPER
RESOURCE MANAGER
EXTERNAL BS
EXT. NETW.
DATA FLOW WITH INDICATION OF DIRECTION

Fig. 7

20807O"0Z78E00T

TRAFFIC CLASS	CONVERSATIONAL	STREAMING	INTERACTIVE	BACKGROUND
MAXIMUM BIT RATE	X	X	X	X
GUARANTEED BIT RATE	X	X		
DELIVERY ORDER	X	X	X	X
MAXIMUM SDU SIZE	X	X	X	X
SDU FORMAT INFO *)	X	X		
SDU LOSS RATIO	X	X	X	X
RESIDUAL BIT ERROR RATIO	X	X	X	X
DELIVERY OF ERRONEOUS SDUs	X	X	X	X
TRANSFER DELAY	X	X		
TRAFFIC HANDLING PRIO			X	
ALLOCATION/RETENTION PRIORITY	X	X	X	X
SOURCE STATISTICS DESCRIPTOR *)	X	X		

*) PARAMETER DIFFERS DEPENDING ON IF IT IS A UMTS BS DESCRIPTION OR A RAB SERVICE DESCRIPTION

Fig. 9

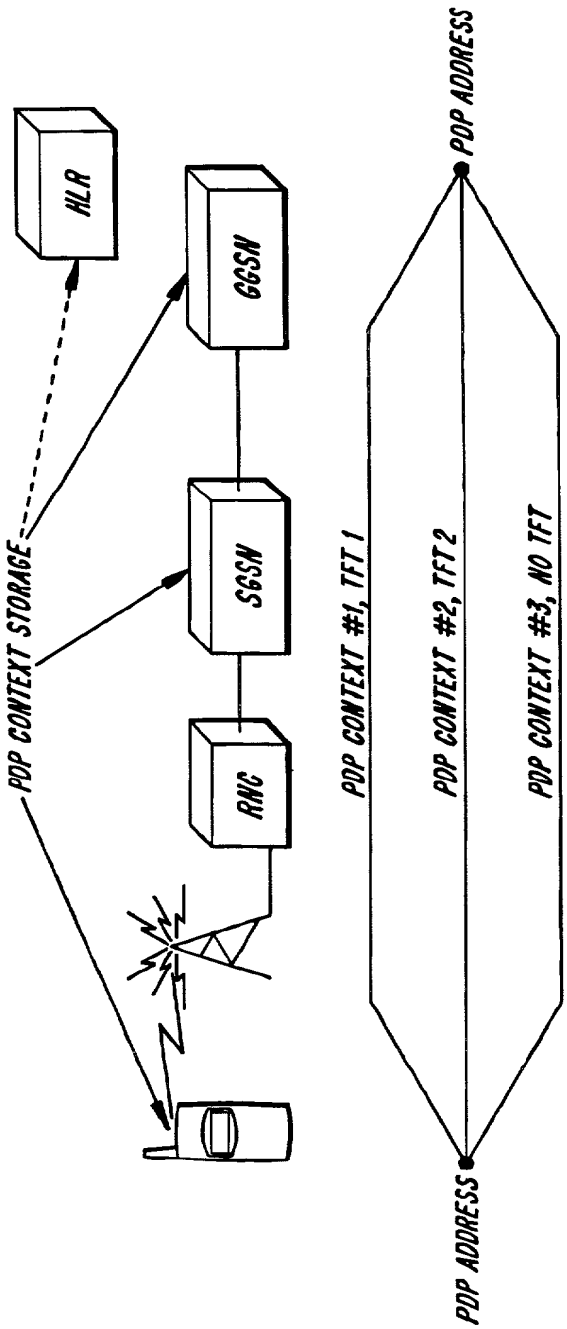

HLR
GGSN
SGSN
RNC
PDP CONTEXT STORAGE
PDP ADDRESS
PDP CONTEXT #1, TFT 1
PDP CONTEXT #2, TFT 2
PDP CONTEXT #3, NO TFT
PDP ADDRESS

Fig. 10

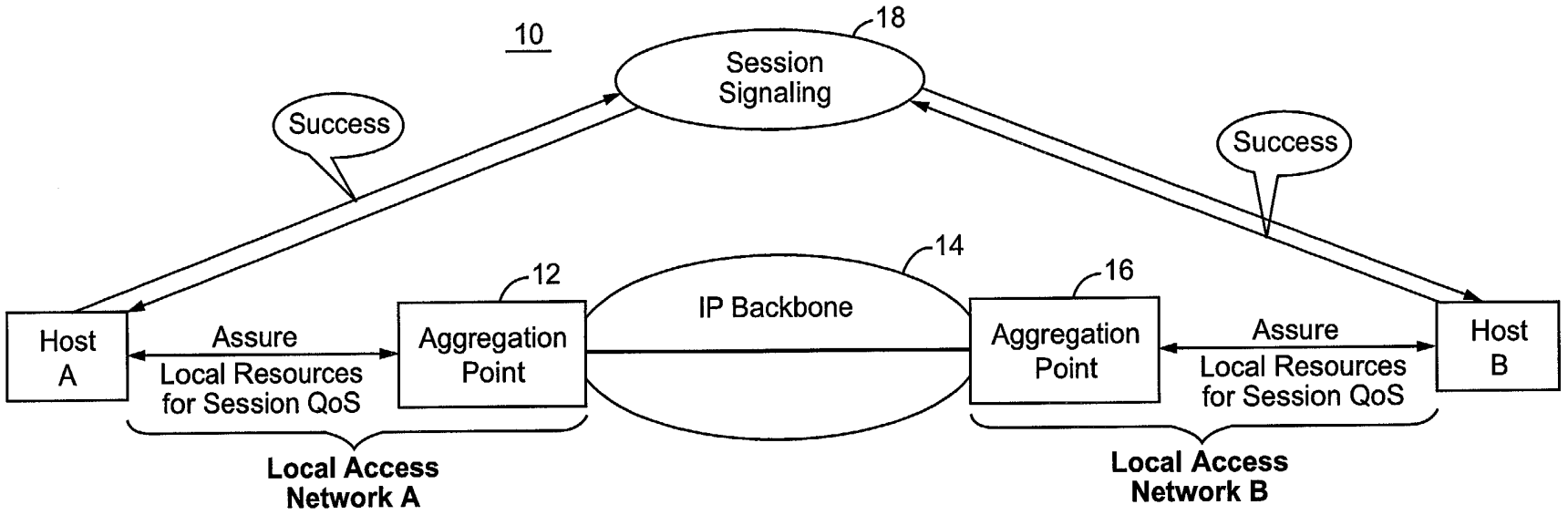
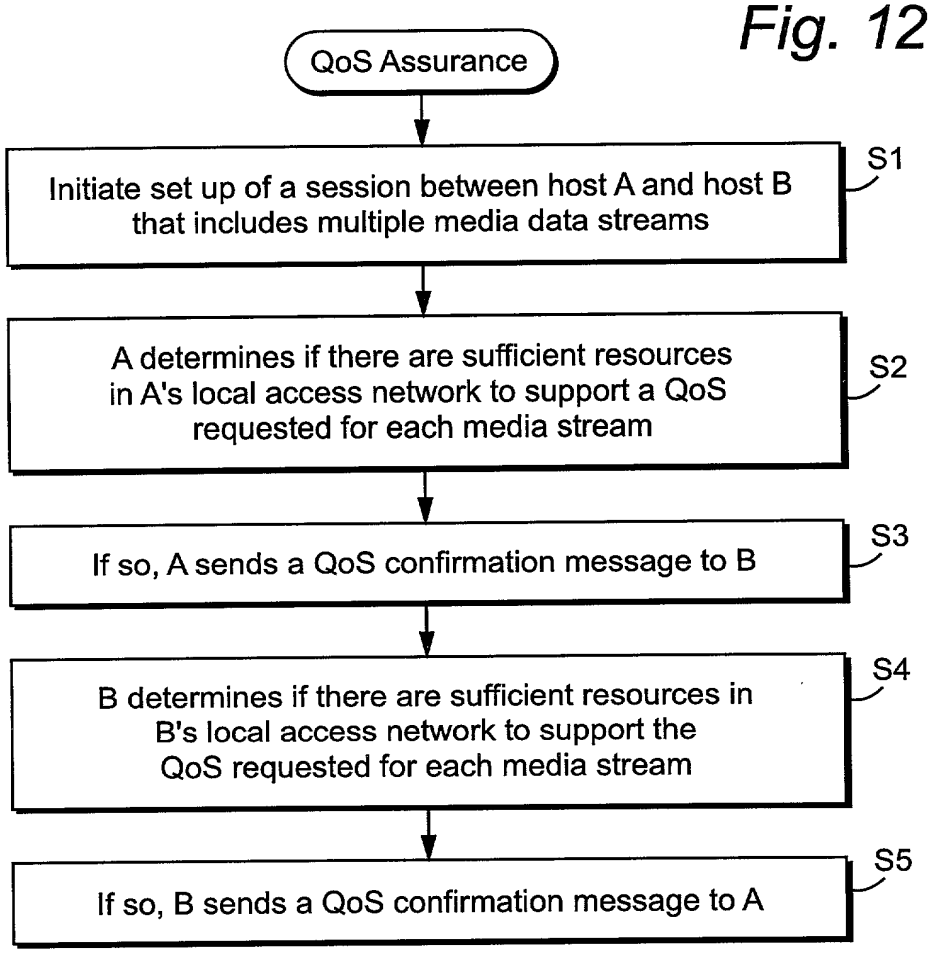

10
18
Session Signaling
Success
Success
14
12
16
IP Backbone
Host A
Assure Local Resources for Session QoS
Aggregation Point
Aggregation Point
Assure Local Resources for Session QoS
Host B
Local Access Network A
Local Access Network B

Fig. 11

Fig. 12


QoS Assurance
Initiate set up of a session between host A and host B that includes multiple media data streams
S1
A determines if there are sufficient resources in A's local access network to support a QoS requested for each media stream
S2
If so, A sends a QoS confirmation message to B
S3
B determines if there are sufficient resources in B's local access network to support the QoS requested for each media stream
S4
If so, B sends a QoS confirmation message to A
S5

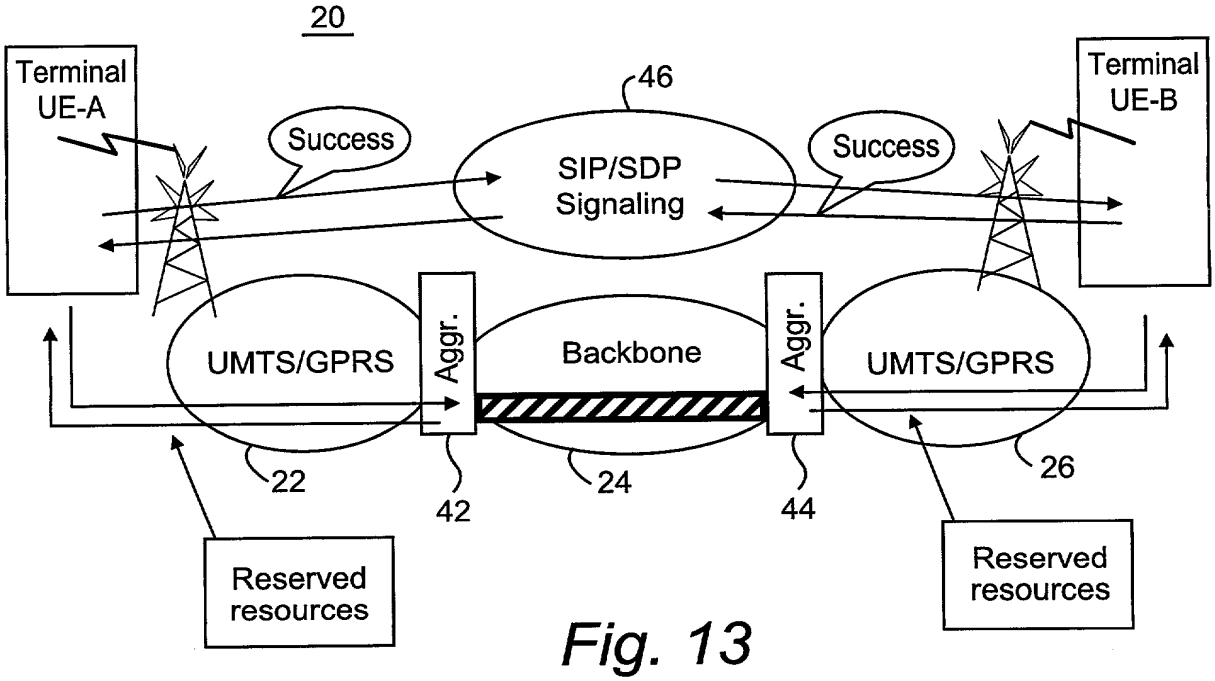

20
Terminal UE-A
Terminal UE-B
46
Success
Success
SIP/SDP Signaling
UMTS/GPRS
Aggr.
Backbone
Aggr.
UMTS/GPRS
22
42
24
44
26
Reserved resources
Reserved resources

Fig. 13

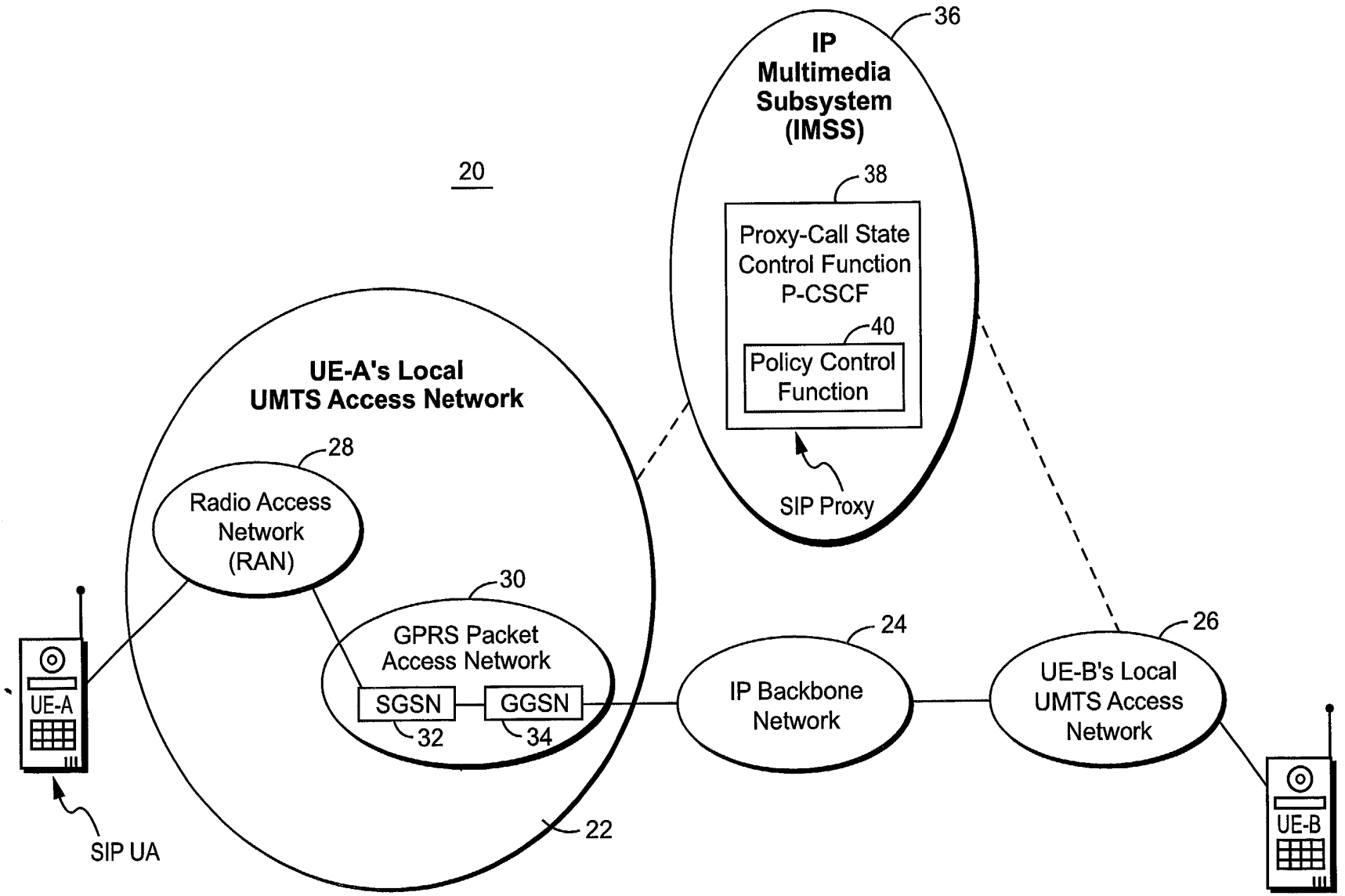

20
IP Multimedia Subsystem (IMSS)
36
38
Proxy-Call State Control Function P-CSCF
40
Policy Control Function
SIP Proxy
UE-A's Local UMTS Access Network
28
Radio Access Network (RAN)
30
GPRS Packet Access Network
SGSN
GGSN
32
34
22
24
IP Backbone Network
26
UE-B's Local UMTS Access Network
UE-A
SIP UA
UE-B
SIP UA Remote

Fig. 14

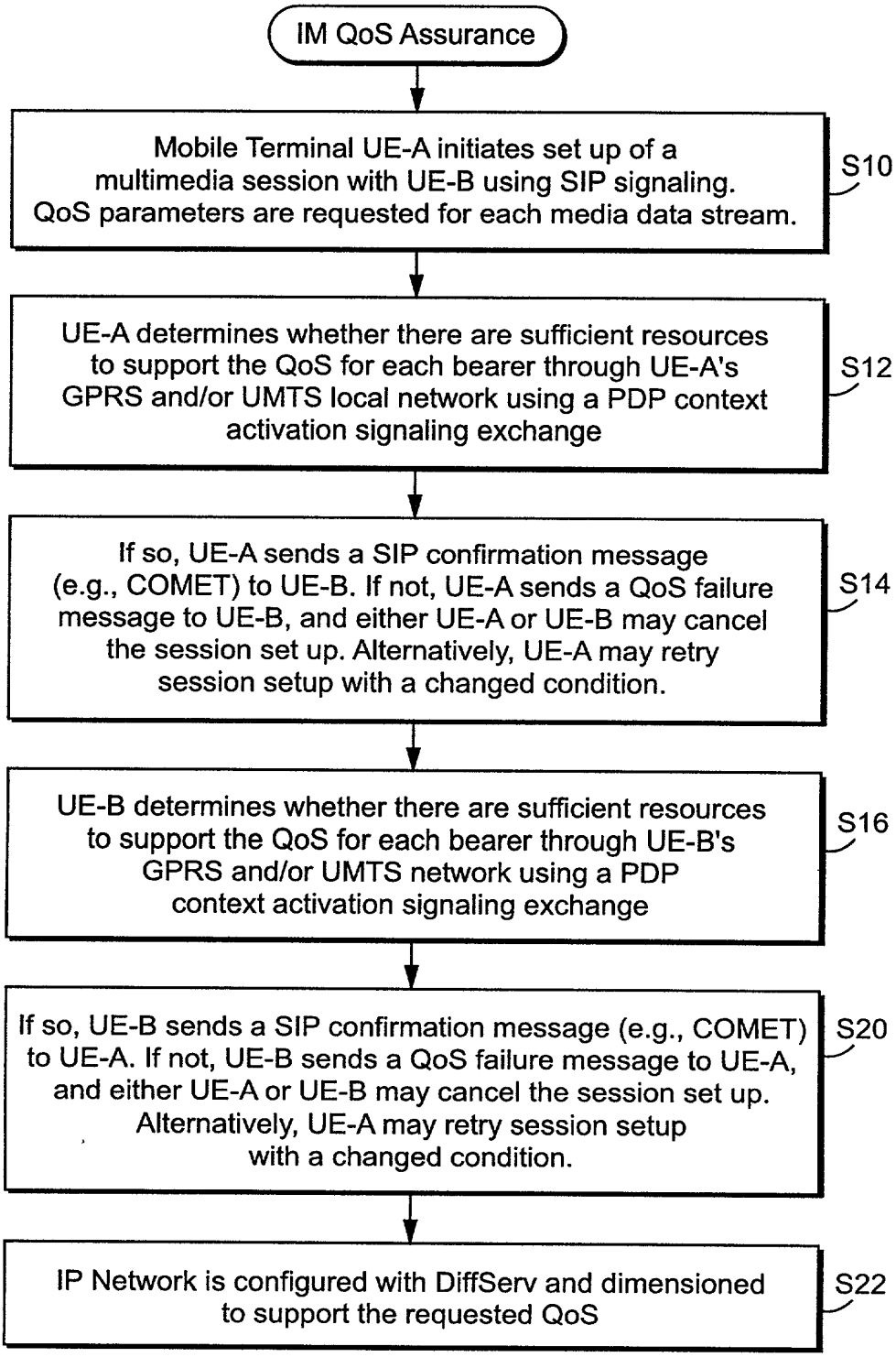

IM QoS Assurance
Mobile Terminal UE-A initiates set up of a multimedia session with UE-B using SIP signaling. QoS parameters are requested for each media data stream.
S10
UE-A determines whether there are sufficient resources to support the QoS for each bearer through UE-A's GPRS and/or UMTS local network using a PDP context activation signaling exchange
S12
If so, UE-A sends a SIP confirmation message (e.g., COMET) to UE-B. If not, UE-A sends a QoS failure message to UE-B, and either UE-A or UE-B may cancel the session set up. Alternatively, UE-A may retry session setup with a changed condition.
S14
UE-B determines whether there are sufficient resources to support the QoS for each bearer through UE-B's GPRS and/or UMTS network using a PDP context activation signaling exchange
S16
If so, UE-B sends a SIP confirmation message (e.g., COMET) to UE-A. If not, UE-B sends a QoS failure message to UE-A, and either UE-A or UE-B may cancel the session set up. Alternatively, UE-A may retry session setup with a changed condition.
S20
IP Network is configured with DiffServ and dimensioned to support the requested QoS
S22

Fig. 15

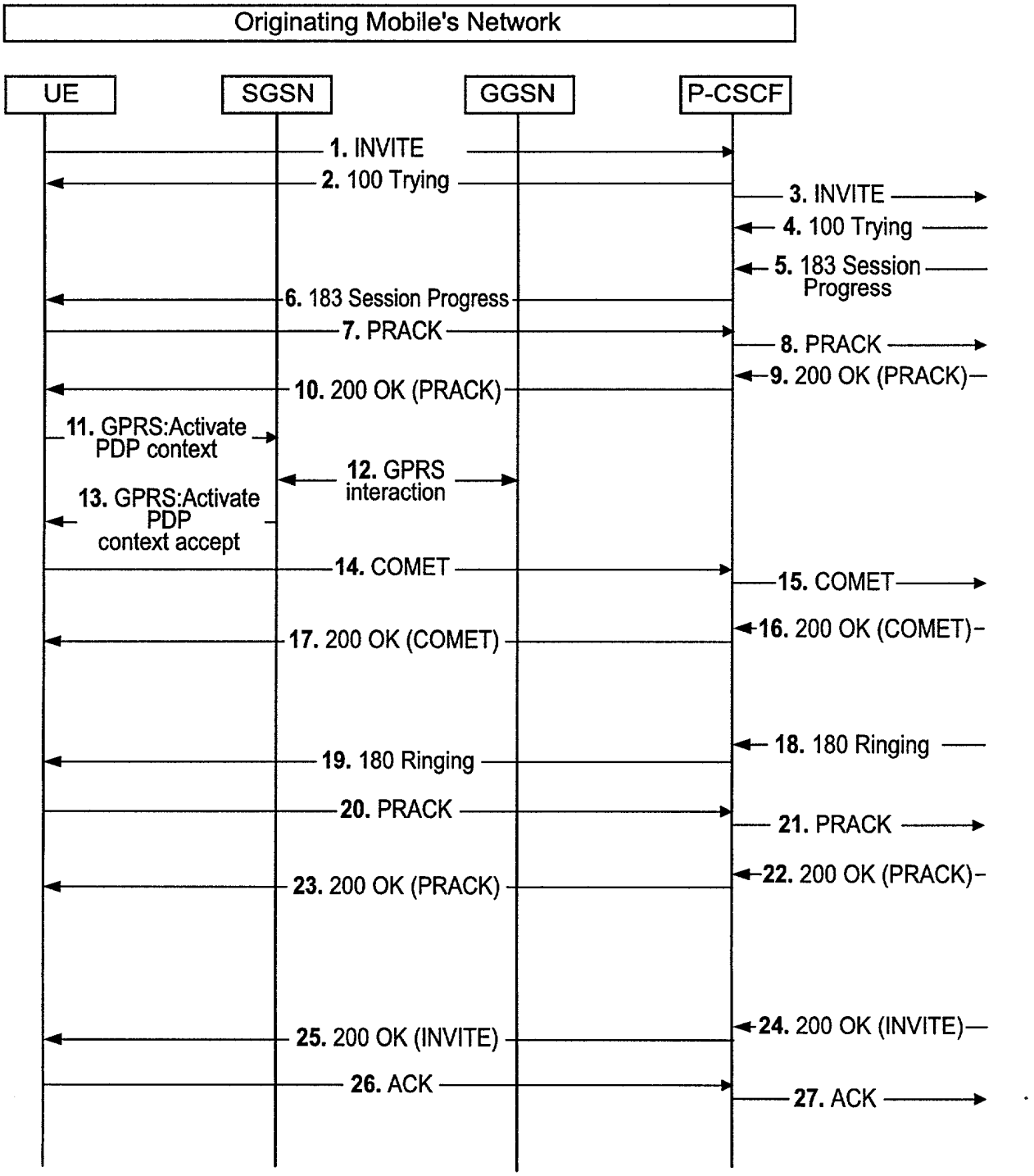

Originating Mobile's Network
UE
SGSN
GGSN
P-CSCF
1. INVITE
2. 100 Trying
3. INVITE
4. 100 Trying
5. 183 Session Progress
6. 183 Session Progress
7. PRACK
8. PRACK
9. 200 OK (PRACK)
10. 200 OK (PRACK)
11. GPRS:Activate PDP context
12. GPRS interaction
13. GPRS:Activate PDP context accept
14. COMET
15. COMET
16. 200 OK (COMET)
17. 200 OK (COMET)
18. 180 Ringing
19. 180 Ringing
20. PRACK
21. PRACK
22. 200 OK (PRACK)
23. 200 OK (PRACK)
24. 200 OK (INVITE)
25. 200 OK (INVITE)
26. ACK
27. ACK

Fig. 16

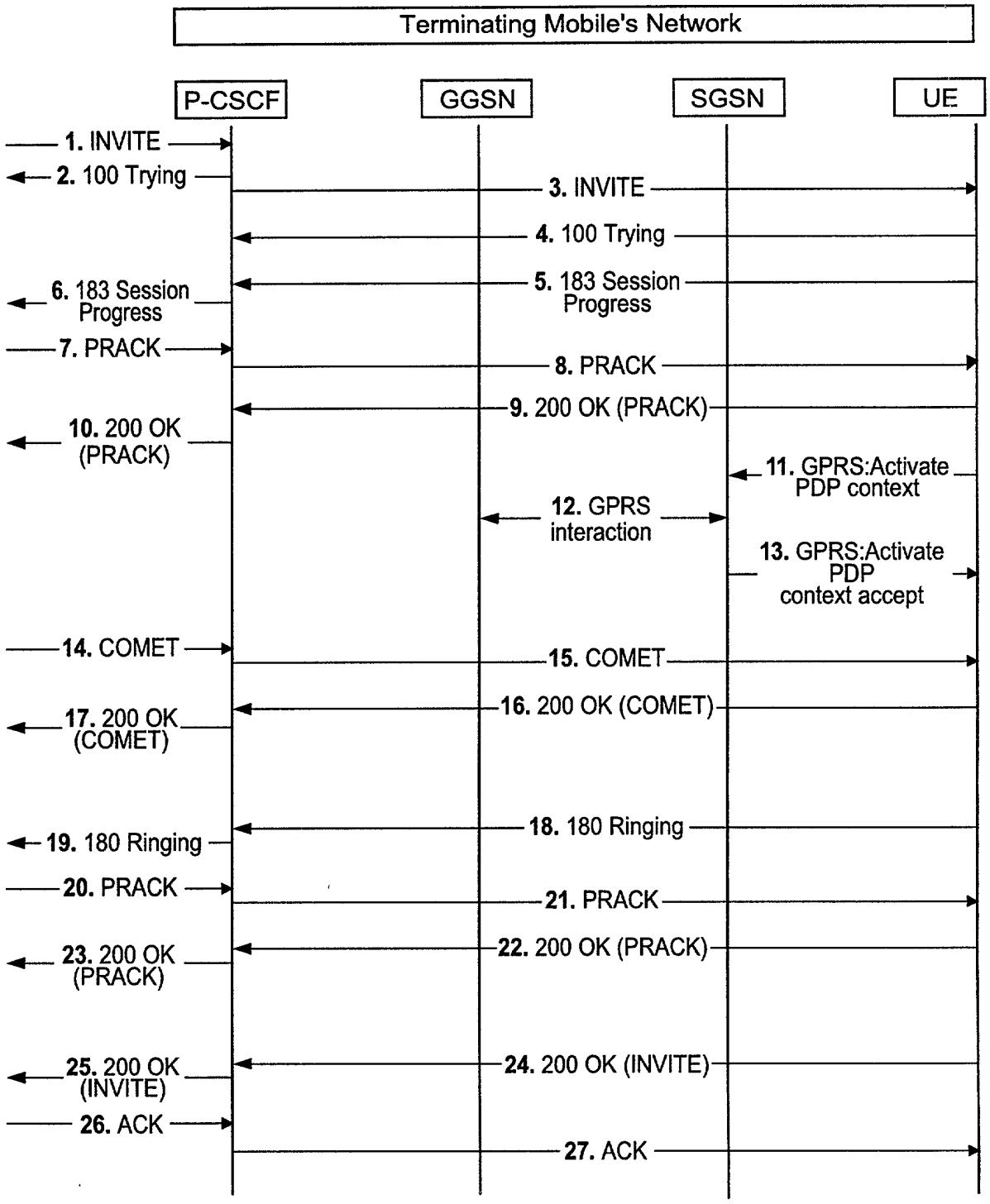

Terminating Mobile's Network
P-CSCF
GGSN
SGSN
UE
1. INVITE
2. 100 Trying
3. INVITE
4. 100 Trying
5. 183 Session Progress
6. 183 Session Progress
7. PRACK
8. PRACK
9. 200 OK (PRACK)
10. 200 OK (PRACK)
11. GPRS:Activate PDP context
12. GPRS interaction
13. GPRS:Activate PDP context accept
14. COMET
15. COMET
16. 200 OK (COMET)
17. 200 OK (COMET)
18. 180 Ringing
19. 180 Ringing
20. PRACK
21. PRACK
22. 200 OK (PRACK)
23. 200 OK (PRACK)
24. 200 OK (INVITE)
25. 200 OK (INVITE)
26. ACK
27. ACK

Fig. 17

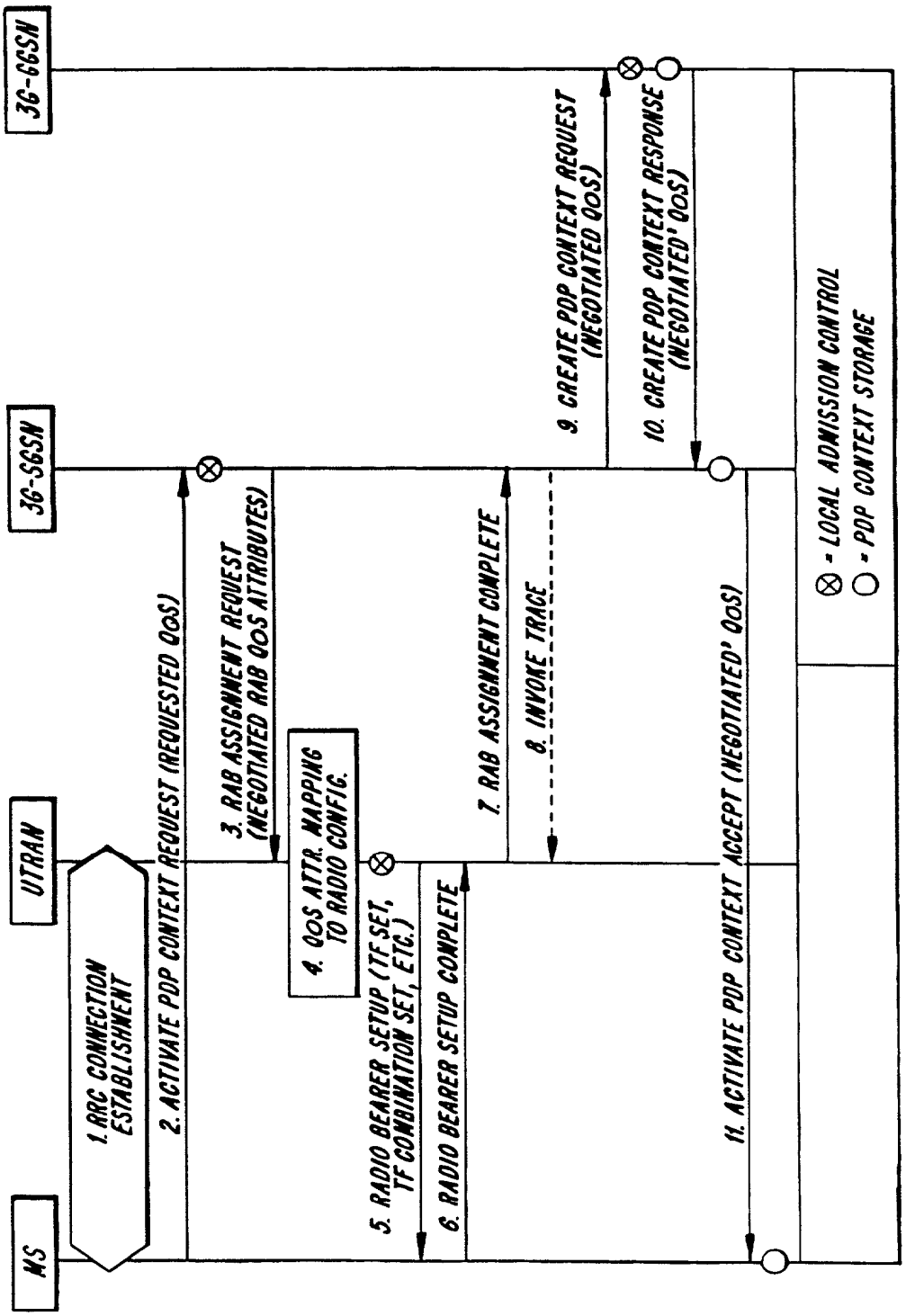

MS
UTRAN
3G-SGSN
3G-GGSN
1. RRC CONNECTION ESTABLISHMENT
2. ACTIVATE PDP CONTEXT REQUEST (REQUESTED QoS)
3. RAB ASSIGNMENT REQUEST (NEGOTIATED RAB QoS ATTRIBUTES)
4. QoS ATTR. MAPPING TO RADIO CONFIG.
5. RADIO BEARER SETUP (TF SET, TF COMBINATION SET, ETC.)
6. RADIO BEARER SETUP COMPLETE
7. RAB ASSIGNMENT COMPLETE
8. INVOKE TRACE
9. CREATE PDP CONTEXT REQUEST (NEGOTIATED QoS)
10. CREATE PDP CONTEXT RESPONSE (NEGOTIATED QoS)
11. ACTIVATE PDP CONTEXT ACCEPT (NEGOTIATED QoS)
⊗ - LOCAL ADMISSION CONTROL
○ - PDP CONTEXT STORAGE

Fig. 18

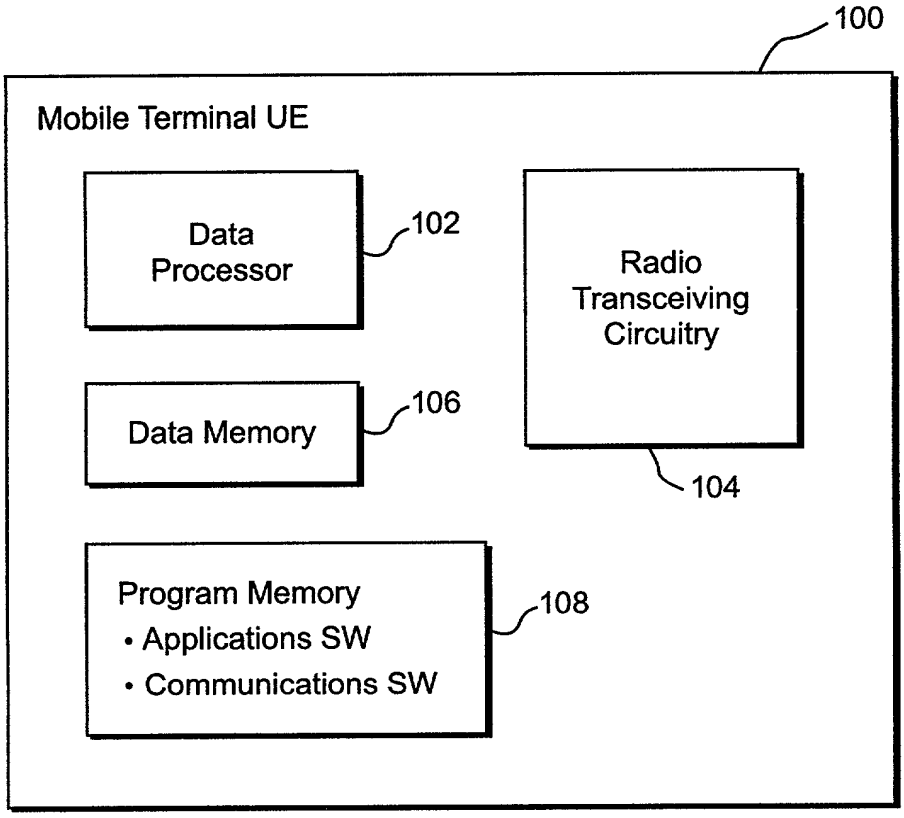

100
Mobile Terminal UE
Data Processor
102
Radio Transceiving Circuitry
Data Memory
106
104
Program Memory
• Applications SW
• Communications SW
108

Fig. 19